

ABSTRACT OF THE DISCLOSURE

Methods for the detection of inflammation associated with vulnerable atherosclerotic plaque to prevent heart attack and stroke are disclosed. The methods are also applicable to detection of infection, cancer, wounds or auto-immune disease in the body. Certain

5 embodiments of the new methods provide a way of predicting the level of vulnerability of an atherosclerotic plaque to rupture or thrombus formation by assessing via fiber optic NIR spectrophotometry the status of two or more parameters associated with inflamed atherosclerotic plaque in a vessel of a living patient. From these measurements such conditions as low pH, hypoxia, low glucose, oxidative stress or compounds abundant in vulnerable plaque such as

10 oxidized LDL cholesterol and oxidized metabolites of NO, significant active macrophage population, thin plaque cap, as well as senescence and/or apoptosis of smooth muscle or endothelial cells are determined with the assistance of a suitably programmed microprocessor. By considering together the status of some or all of these conditions with respect to successive sites along a vessel wall, particular plaques which are at significant risk of rupturing or

15 thrombosing can be distinguished from "normal" vessel wall and from "intermediate" and relatively stable or "lower risk" plaques. Sites having more of the indicator conditions would be considered most in need of prompt intervention, and certain combinations of parameter levels would be suggestive of relatively stable plaque.

Also disclosed is a multi-parameter catheter and analytical processing assembly for use in

20 the methods.

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